We claim:

1. An implantable, biocompatible scaffold, comprising:

a biocompatible, porous, polymeric matrix,

a biocompatible, porous, fibrous mat encapsulated by and disposed within said polymeric matrix; and

a plurality of mammalian cells seeded within said tissue scaffold.

2. The scaffold of claim 1 wherein said scaffold is biodegradable.

3. The scaffold of claim 1 wherein said polymeric matrix comprises a polymer selected from the group consisting of biodegradable polymers and said fibrous mat comprises fibers comprising materials selected from the group consisting of biodegradable glasses and ceramics comprising calcium phosphate and biodegradable polymers.

4. The scaffold of claim 3 wherein said polymeric matrix and said fibrous mat comprise biodegradable polymers.

5. The scaffold of claim 4 wherein said biodegradable polymers are selected from the group consisting of homopolymers and copolymers of aliphatic polyesters, polyalkylene oxalates, polyamides, polycarbonates,

polyorthoesters, polyoxaesters, polyamidoesters, polyanhydrides and polyphosphazenes.

6. The scaffold of claim 5 wherein said fibrous mat comprises a 90/10 copolymer of polyglycolide/polylactide.

7. The scaffold of claim 5 wherein said fibrous mat comprises polydioxanone.

Need to add a claim on the weight percentage of the polymer solution used to fabricate the matrix: 0.1-10% wt, preferred from 0.1-5% wt

8. The scaffold of claim 5 wherein said polymeric matrix comprises a copolymer of polylactide and polyglycolide in a molar ratio ranging from about 95/5 to about 85/15 polylactide/polygycolide.

9. The scaffold of claim 6 wherein said porous, polymeric matrix comprises a copolymer of polycaprolactone and polyglycolide in a molar ratio of from about 35/65 to about 45/55 polycaprolactone/polyglycolide.

10. The scaffold of claim 9 wherein said porous, polymeric matrix comprises a foam.

11. The scaffold of claim 5 wherein said porous, polymeric matrix comprises a copolymer of polylactide and polycaprolactone in a molar ratio of from about 35/65 to about 65/35 polylactide/polycaprolactone.

12. The scaffold of claim 1 wherein said fibrous mat comprises fibers in a form selected from the group consisting of threads, yarns, nets, laces, felts and nonwovens.

13. The scaffold of claim 1 wherein said mammalian cells are selected from the group consisting of bone marrow cells, smooth muscle cells, stromal cells, stem cells, mesenchymal stem cells, synovial derived stem cells, embryonic stem cells, blood vessel cells, chondrocytes, osteoblasts, precursor cells derived from adipose tissue, bone marrow derived progenitor cells, kidney cells, intestinal cells, islets, beta cells, Sertoli cells, peripheral blood progenitor cells, fibroblasts, glomus cells, keratinocytes, nucleus pulposus cells, annulus fibrosus cells, fibrochondrocytes, stem cells isolated from adult tissue, oval cells, neuronal stem cells, glial cells, macrophages, and genetically transformed cells.

14. The scaffold of claim 13 wherein said cells are selected from the group consisting of islets and Sertoli cells.

15. The scaffold of claim 13 wherein said cells are selected from the group consisting of adult neuronal stem cells, embryonic stem cells and glial cells.

16. The scaffold of claim 1 further comprising a biological factor.

17. The scaffold of claim 16 wherein said biological factor is a growth factor selected from the group consisting of TGF-β1, TGF-β2, TGF-β3, BMP-2, BMP-4, BMP-6, BMP-12, BMP-13, fibroblast growth factor-1, fibroblast growth factor-2, platelet-derived growth factor-AA, platelet-derived growth factor-BB, platelet rich plasma, IGF-I, IGF-II, GDF-5, GDF-6, GDF-8, GDF-10, vascular endothelial cell-derived growth factor, pleiotrophin, endothelin, nicotinamide, glucagon like peptide-I, glucagon like peptide-II, Exendin-4, retinoic acid, parathyroid hormone, tenascin-C, tropoelastin, thrombin-derived peptides, laminin, biological peptides containing cell-binding domains and biological peptides containing heparin-binding domains.

18. The scaffold of claim 1 further comprising a therapeutic agent.

19. The scaffold of claim 18 wherein said therapeutic agent is selected from the group consisting of anti-rejection agents, analgesics, anti-oxidants, anti-apoptotic agents, Erythropoietin, anti-inflammatory agents, anti-tumor necrosis factor α, anti-CD44, anti-CD3, anti-CD154, p38 kinase inhibitor, JAK-STAT inhibitors, anti-CD28, acetoaminophen, cytostatic agents, Rapamycin, and anti-IL2 agents.

20. A method of treating a disease in a mammal comprising implanting a biocompatible scaffold in said mammal, said scaffold comprising:

a biocompatible, porous, polymeric matrix,

a biocompatible, porous, fibrous mat encapsulated by and disposed within said polymeric matrix; and

a plurality of mammalian cells seeded within said tissue scaffold.

21. The method of claim 20 wherein said scaffold is biodegradable.

22. The method of claim 20 wherein said polymeric matrix comprises a polymer selected from the group consisting of biodegradable polymers and said fibrous

mat comprises fibers comprising materials selected from the group consisting of biodegradable glasses and ceramics comprising calcium phosphate and biodegradable polymers.

23. The method of claim 20 wherein said polymeric matrix and said fibrous mat comprise biodegradable polymers.

24. The method of claim 23 wherein said biodegradable polymers are selected from the group consisting of homopolymers and copolymers of aliphatic polyesters, polyalkylene oxalates, polyamides, polycarbonates, polyorthoesters, polyoxaesters, polyamidoesters, polyanhydrides and polyphosphazenes.

25. The scaffold of claim 24 wherein said fibrous mat comprises a 90/10 copolymer of polyglycolide/polylactide.

26. The method of claim 25 wherein said polymeric matrix comprises a copolymer of polycaprolactone and polyglycolide in a molar ratio of from about 35/65 to about 45/55 polycaprolactone/polyglycolide.

27. The method of claim 26 wherein said polymeric matrix comprises a foam.

28. The method of claim 20 wherein said mammalian cells are selected from the group consisting of bone marrow cells, smooth muscle cells, stromal cells, stem cells, mesenchymal stem cells, synovial derived stem cells, embryonic stem cells, umbilical cord blood cells, umbilical Wharton's jelly cells, blood vessel cells, chondrocytes, osteoblasts, precursor cells derived from adipose tissue, bone marrow derived progenitor cells, kidney cells, intestinal cells, islets, beta cells, pancreatic ductal progenitor cells, Sertoli cells, peripheral blood progenitor cells, fibroblasts, glomus cells, keratinocytes, nucleus pulposus cells, annulus fibrosus cells, fibrochondrocytes, stem cells isolated from adult tissue, oval cells, neuronal stem cells, glial cells, macrophages, and genetically transformed cells.

29. The method of claim 20 wherein said disease is diabetes mellitis.

30. The method of claim 29 wherein said scaffold is seeded with Sertoli cells and islets.

31. The method of claim 29 wherein said device further comprises a biological factor.

32. A method of treating a structural defect in a mammal comprising implanting a biocompatible scaffold in said mammal, said scaffold comprising:

a biocompatible, porous, polymeric matrix,

a biocompatible, porous, fibrous mat encapsulated by and disposed within said polymeric matrix; and

a plurality of mammalian cells seeded within said tissue scaffold.

33. The method of claim 32 wherein said scaffold is biodegradable.

34. The method of claim 32 wherein said mammalian cells are selected from the group consisting of bone marrow cells, smooth muscle cells, stromal cells, stem cells, mesenchymal stem cells, synovial derived stem cells, embryonic stem cells, umbilical cord blood cells, umbilical Wharton's jelly cells, blood vessel cells, chondrocytes, osteoblasts, precursor cells derived from adipose tissue, bone marrow derived progenitor cells, kidney cells, intestinal cells, islets, beta cells, pancreatic ductal progenitor cells, Sertoli cells, peripheral blood progenitor cells, fibroblasts, glomus cells, keratinocytes, nucleus pulposus cells, annulus fibrosus cells, fibrochondrocytes, stem cells isolated from adult tissue, oval cells, neuronal stem cells,

glial cells, macrophages, and genetically transformed cells.

35. The method of claim 32 wherein said structural defect is in tissue selected from the group consisting of articular cartilage, meniscus, and bone.